## A.4.12 AOC 6C

### Description

This AOC consists of petroleum materials identified in several soil borings installed during the installation of an expanded groundwater monitoring system by DRAI in 1991. The original AOC 6 consisted of borings B-26, B-29, B-30, B-31, B-32, B-33 and B-34. These borings were broken into three separate areas that represent potentially separate sources as follows:

- AOC 6A includes borings B-26 and B-34, which are both located in the North Field between Tanks 326 and 328.
- AOC 6B includes borings B-29, B-30 and B-31 which are located in the East Yard in the vicinity of Tank 759, Pier 2 and the Arthur Kill bulkhead.
- AOC 6C includes borings B-32 and B-33, which are also located in the East Yard on the north side of Tank 773 near the Hess/Chevron property line.

As noted above, AOC 6C was established based on oily petroleum material identified in Pre-RFI borings B-32 and B-33. AOC 6C is located north of Tank 773 near the Chevron/Hess property line in the East Yard.

As shown on Figure A.4.9, and summarized on Table A.4.9, five borings, 10 soil samples, one hydropunch sample and one temporary piezometer (A6CTP1/S0861) have been used to characterize this AOC. In addition, relevant data from SWMU 8 and AOC 16 are also shown on Table A.4.9 for delineation purposes. One boring and one hydropunch sample were installed during the 1st-Phase RFI, and one soil sample was submitted to the laboratory for TPH GC fingerprint analysis. During the Full RFI, nine soil samples were collected from three borings and analyzed for TCL VOCs and SVOCs, and TAL metals. One sample was also analyzed for SPLP metals and physical characteristics.[1]

### Soil

Chevron installed two additional borings (S0825 and S0826) at the approximate location depicted on Figure A.4.9 to complete delineation near the property boundary and to determine whether measurable LNAPL is present in the vicinity of AOC 6C. A third boring (A6CTP1/S0861) was completed as a temporary piezometer.

The following table summarizes the number of samples where delineation criteria were exceeded:

[1]Physical characteristics specified in Appendix A, Task IV of Module III of the HWSA Permit included saturated and unsaturated permeability tests, moisture content, relative permeability, bulk density, porosity, soil sorptive capacity, CEC, TOC, pH, Eh and grain size distribution.

| Constituents of Concern | Surface Soils (0 to 2 ft) | Fill Material (>2 ft) | Native Soils | Total |
|---|---|---|---|---|
| Benzene | 0/3 | 0/3 | 0/3 | 0/9 |
| Other VOCs | 0/3 | 0/3 | 0/3 | 0/9 |
| Benzo(a)pyrene | 0/3 | 0/3 | 0/3 | 0/3 |
| Other SVOCs | 0/3 | 0/3 | 0/3 | 0/9 |
| Lead | 1/3 | 0/3 | 0/3 | 1/9 |
| Other TAL Metals[a] | 2/3 | 0/3 | 0/3 | 2/9 |

[a]Totals do not include naturally-occurring metal compounds in excess of the delineation criteria (Al, Ca, Fe, Mg, Mn, K and Na).

**Surface soils (0 to 2 feet bgs)**

Some staining was noted at SB0180 at zero to two feet bgs. Antimony (17.6J mg/kg) and lead (472 mg/kg) were detected above the soil delineation criteria in the surface soil sample for S0825, and arsenic (26.3 mg/kg) was detected above the soil delineation criterion in the surface soil sample from S0861 (A6CTP1). Therefore, potential impacts appear to be limited to surface soils.

**Fill Materials (>2 feet bgs)**

Staining, odors and other evidence of petroleum impacts were noted in two of the borings (S0826 and SB0180). The thickness of the fill layer ranges from approximately 12 to 14 feet in the vicinity of AOC 6C. Measurable LNAPL has not been detected at AOC 6C. There were no exceedances of the applicable soil delineation criteria in any of the subsurface fill samples, except for naturally-occurring iron. Therefore, site-related impacts have been delineated vertically.

**Native Material**

A clay/peat layer underlies the fill material in this part of the Refinery. In general, the peat layer is approximately 12 to 14 feet bgs. There were no exceedances of the applicable soil delineation criteria in any of the native samples, except for naturally-occurring iron.

**Groundwater**

HP0117 was installed during the 1st-Phase Groundwater Investigation, and H0460 was installed as part of the 2nd-Phase OWSS activities. The sample from HP0117 contained benzene (6 µg/L) above the delineation criteria, as well as numerous metals, including lead, which was detected at 997 µg/L. H0460 was installed in 1999, and analytical data indicate that arsenic and lead are present above the applicable criteria (14.9 µg/L and 291 µg/L, respectively). Both of these samples were collected using traditional hydropunch methodology (porous media was used to collect the H0460 sample for metals analysis). The presence of metals in these two samples is likely attributed to the sample collection methods and not representative of groundwater conditions at AOC 6C. Further discussion of groundwater impacts can be found in Section 8 of the RFI Report.

## Summary

Three metals (antimony, arsenic and lead) are present at concentrations above their respective delineation criteria at AOC 6C. The greatest impacts are found within the surficial fill layer. The one elevated detection of arsenic (26.3 mg/kg) is within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Sanders, 2003). Both antimony (17.6J mg/kg) and lead (472 mg/kg) were present in one sample above the residential direct contact criteria, but below the industrial direct contact criteria. Petroleum-related impacts have not been confirmed at AOC 6C, based on the fact that there were no exceedances of organic compounds in any of the nine soil samples collected from this AOC. Nonetheless, the use of engineering controls/deed restrictions for metals will be evaluated in the CMS. Potential groundwater impacts will also be evaluated further in the site-wide groundwater portion of the CMS.